

• Geometry

Aims of the session

- **Introduce the concepts of 'geometry' and its significance in Data Processing**

At the end of this Session, you will be able to:

- **Define the term geometry**
- **Describe the following terms : receiver, channel, group, trace, channel no., trace no., source/shot, shotpoint, field file, shotpoint no., field file no., record/gather, station, station no**
- **Describe the following terms : trace offset, near trace offset, far trace offset, active streamer length**
- **Calculate various distances for a given geometry setup.**
- **Explain what is meant by the following : common shot, common mid-point, common receiver, and common offset gathers**
- **Describe the different types of Land and Marine Field Layouts and define the following shooting terms : end on, symmetric split-spread, asymmetric split-spread**

At the end of this Session, you will be able to:

- **Define the term 'multiple coverage'.**
- **List the advantages of multiple coverage.**
- **Describe the concept of CMP coverage, using stacking diagram examples.**
- **Build a simple stacking diagram and calculate: trace offsets, nominal fold, last full-fold CMP, last CMP.**
- **Explain how, the source station and receiver station separation can control the CMP interval, the fold and the offset distribution.**

At the end of this Session, you will be able to:

- **To describe 3D acquisition techniques and its effect on geometry.**
- **Define the following terms: 'sub-surface line', 'bin', 'sail line'**
- **To describe common navigation and survey storage formats used in the field.**
- **Identify UKOOA P1/90 and SPS format navigation/survey data files.**
- **Explain the consequence of trace summation or trace decimation on the following: coverage, trace offsets, effective group interval, CMP interval and trace no.**

Definitions

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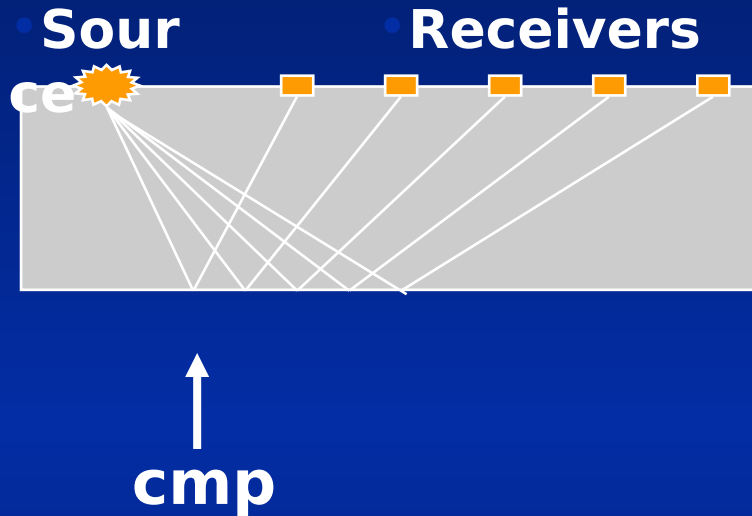
Geometry

The area of mathematics relating to the study of space and the relationships between points, lines, curves and surfaces

Geometry in Seismic means defining where everything is located using the following -

- **Coordinates of shot and receivers**
- **Relationship between 'file' numbers and shot locations**
- **Relationship between shots and receivers**
- **Missing shots and/or receivers**
- **Attributes for shots/receivers e.g. elevations, depths etc**

Geometry allows us to determine cmp positions



Raw shot data

• If we know the positions of the source and receiver then we can calculate the position of a Common Mid Point.

Question ; Where is the common mid point???

Answer; half way between the positions of the source & receiver

Imagine a CMP as a pole going many kilometers into the ground

All reflections from one source into one receiver

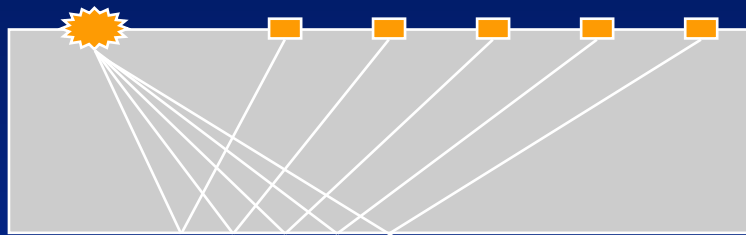
MP



**The Microphones
listen for the echos for
anywhere between 5 to
20 seconds**

DP START Oslo

Common Midpoint Position



Raw shot data

• STEP

1

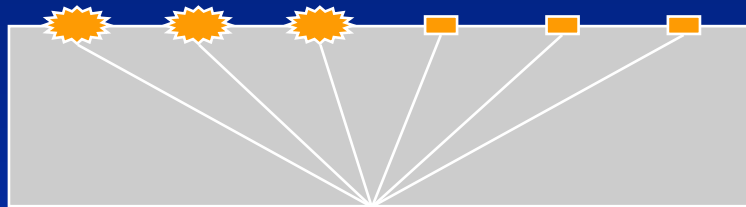
• STEP

2

• STEP

3

← Geometry definition



CMP gather data

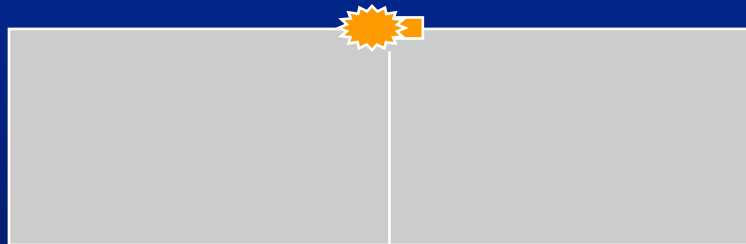
Now we can see why the position is called **COMMON midpoint position**; here we show the midpoint position **COMMON** to 3 traces

← NMO correction

• STEP

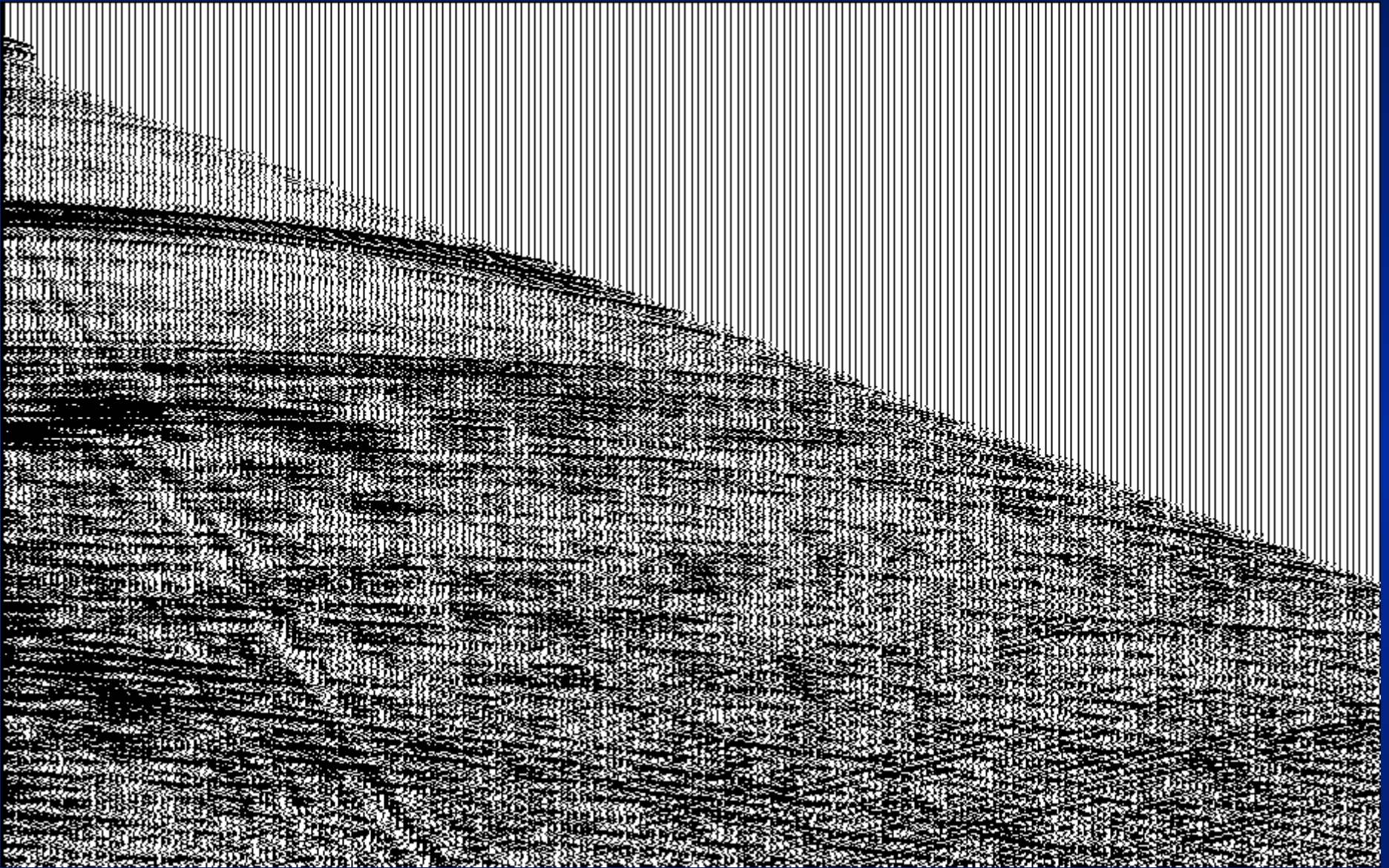
4

STEP 5



Stacked data

Raw Shot Gather



DP START Oslo
2004

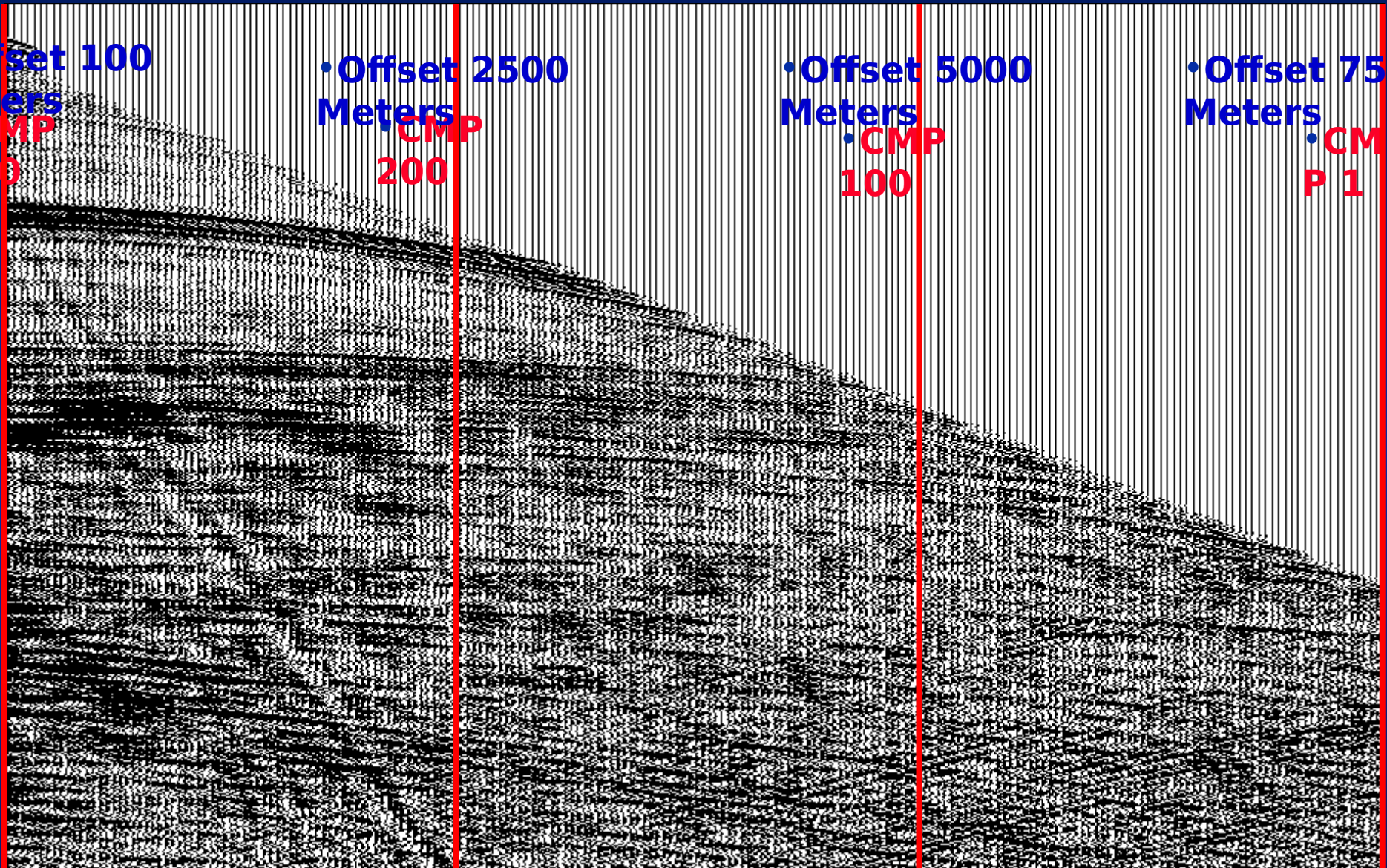
Raw Shot Gather with Geometry applied

• Offset 100
Meters
• CMP
300

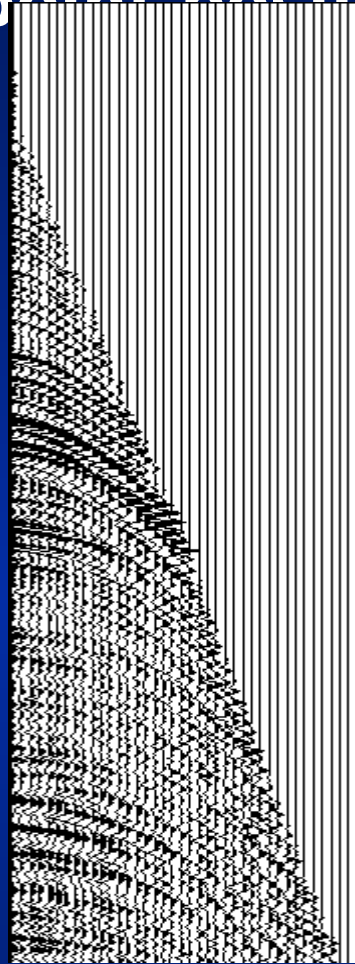
• Offset 2500
Meters
• CMP
200

• Offset 5000
Meters
• CMP
100

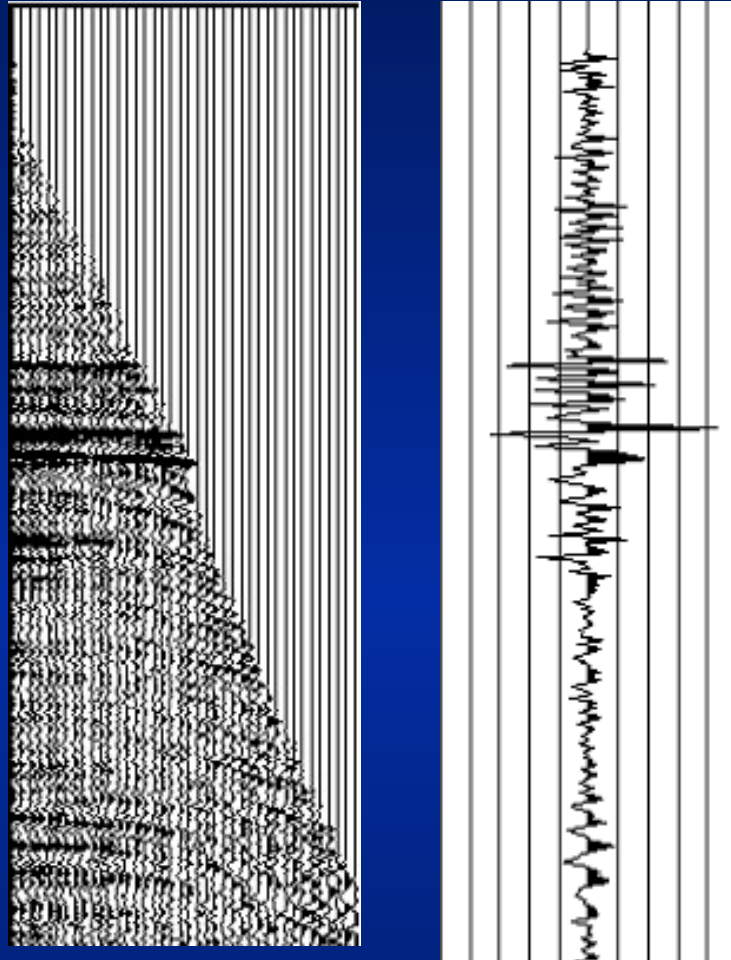
• Offset 7500
Meters
• CMP
P 1



CMP Gather - all traces with the same common mid point position



CMP Gather - With Normal Move Out Applied



- For a given time amplitudes from all traces are added together to create 1 new trace - **The Stacked Trace**

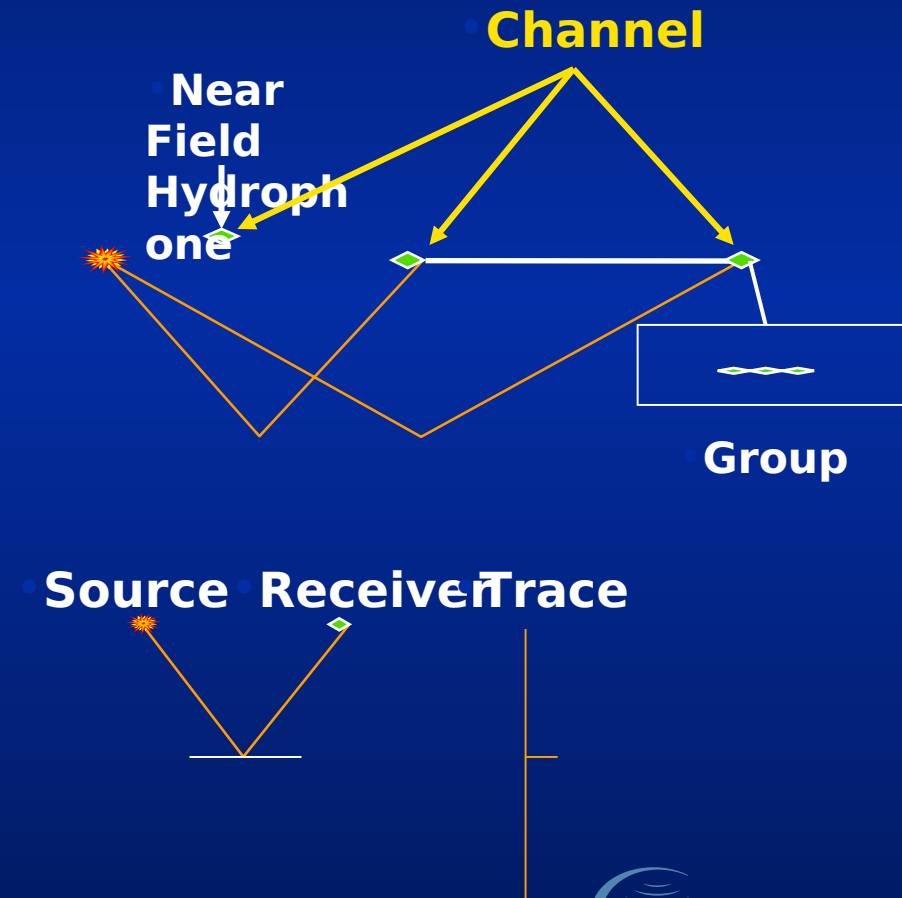
Definitions

- **Receiver** - A geophone in land or a hydrophone in marine. The part of the acquisition system that receives the seismic signal.

- **Channel** - A single series of interconnected devices through which data can flow. A channel can record information from 1 single receiver or from a number of receivers summed together to form a group. Or from any other listening device.

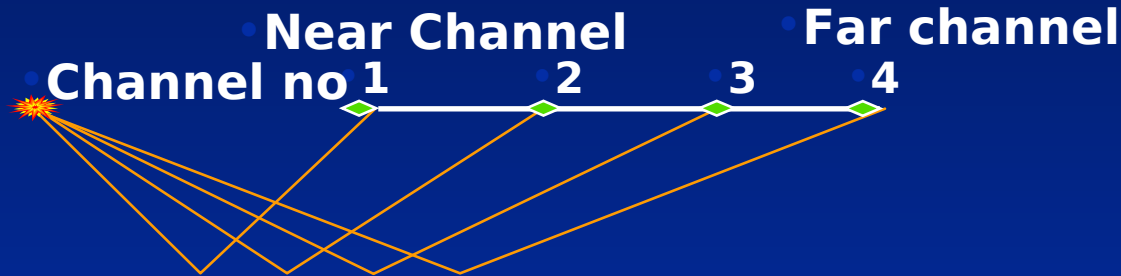
- **Group** - A number of receivers summed together to form a

- **Trace** - A record of seismic data from one channel, ie can come from one single receiver or a summed group of receivers.

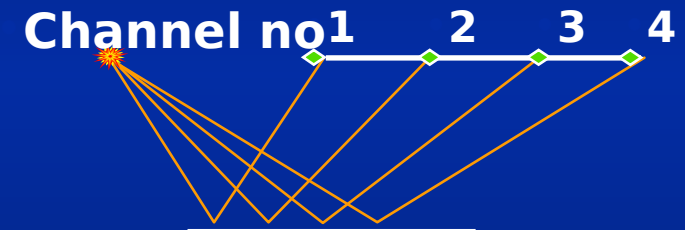


Definitions

- **Channel no-** The number assigned to each recording channel in the survey. In marine the near channel is usually labeled 1.



- **Trace no-** The number assigned to every trace recorded in the survey



• Trace no 1 2 3 4



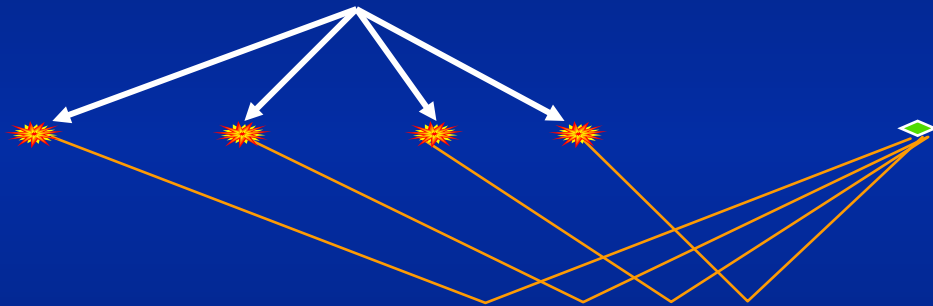
Definitions

- **Source/Shot-** A device that releases energy. In the marine case an air gun or in the land case a vibrator or dynamite



- **Shotpoint-** The location where we want our energy release to occur

Shotpoint



- **Field File-** A gather of information recorded at each channel for a single shot



Field File record



Definitions

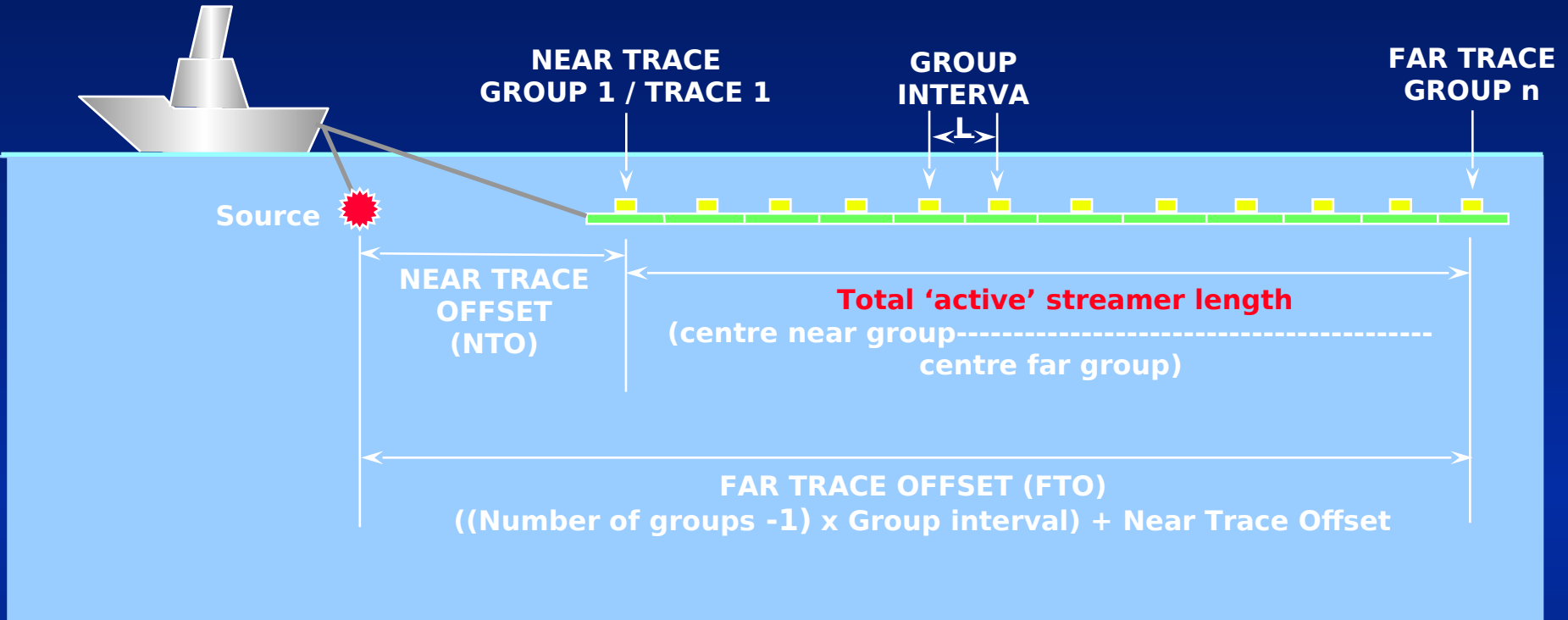
- **Shotpoint no-**A number assigned to the physical location where we want our energy release to occur
- **Field File no-** A number assigned to a gather of information recorded at each channel for a single shot



Definitions

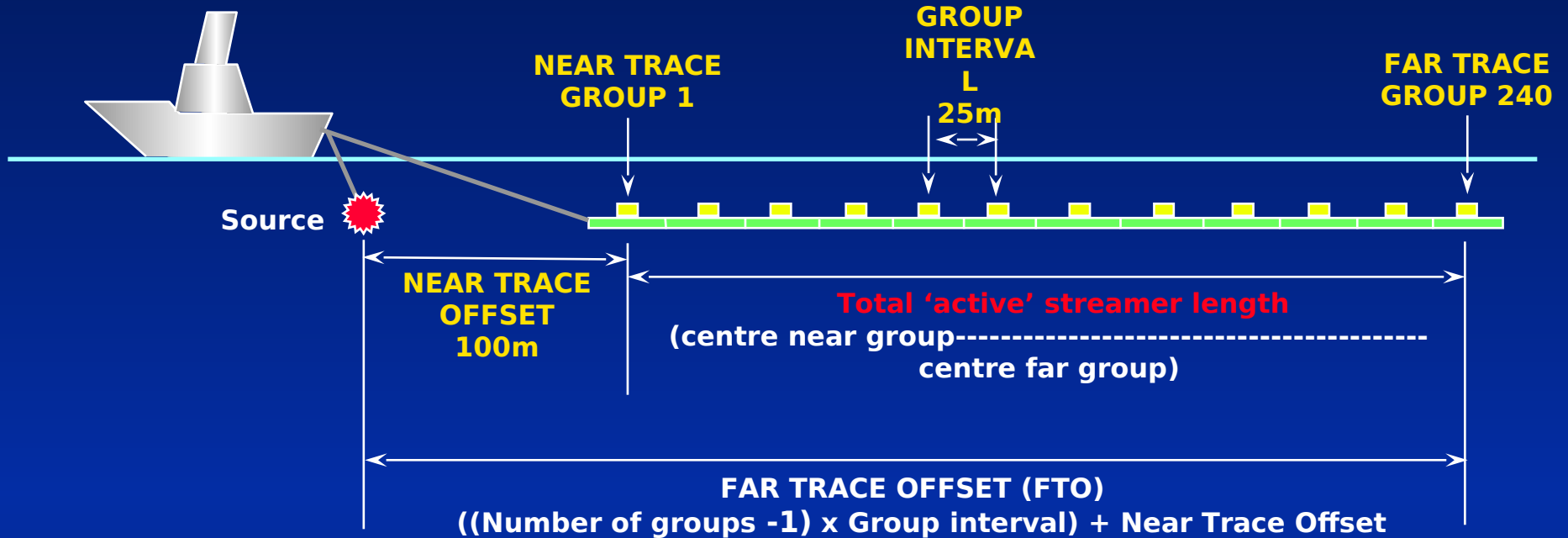
- **Record/Gather-** A group of data handled by a computer as a single block of data. In Seismic we have shot, receiver, cmp and stack records/gathers.

Definitions



- **[TRACE/GROUP] OFFSET** refers to distances relative to center of source
- **OFFSETS of TRACES/GROUPS** measured to the center of streamer sections
- **OFFSETS** important measurement derived from field geometry from a **DP** perspective

Calculations



- Given the above diagram calculate the following
 - Total Active Streamer length
 - Far Trace Offset
 - Offset to receiver group 30
 - Offset of CMP for receiver group 120 (ie. How far from the source is the cmp generated by group number 120) ?

More Calculations

For Marine acquisition parameters :

Near trace offset

310m

Group interval

50m

Calculate the following :

Number of groups

1) Total active length of streamer

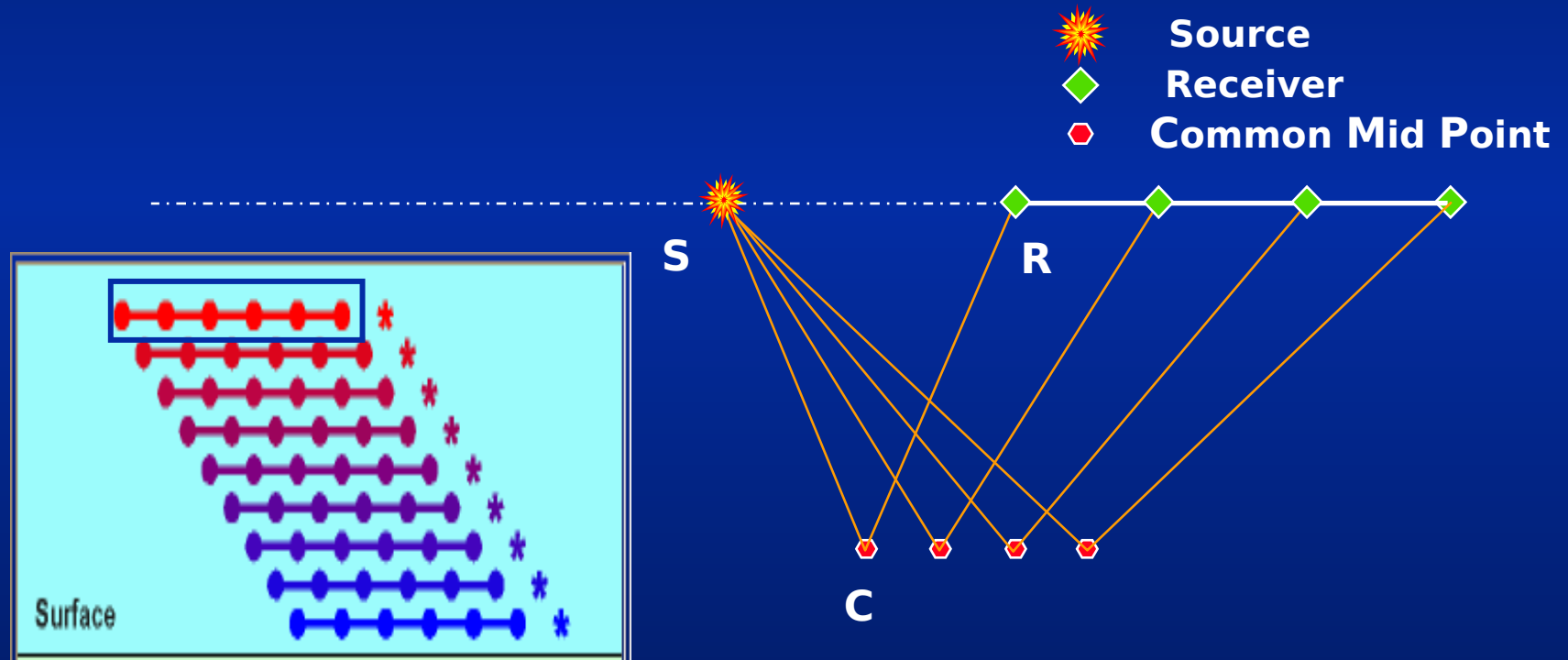
2) Offset to far receiver group

3) Offset to receiver group number 78

4) Offset of CMP for receiver group number 60

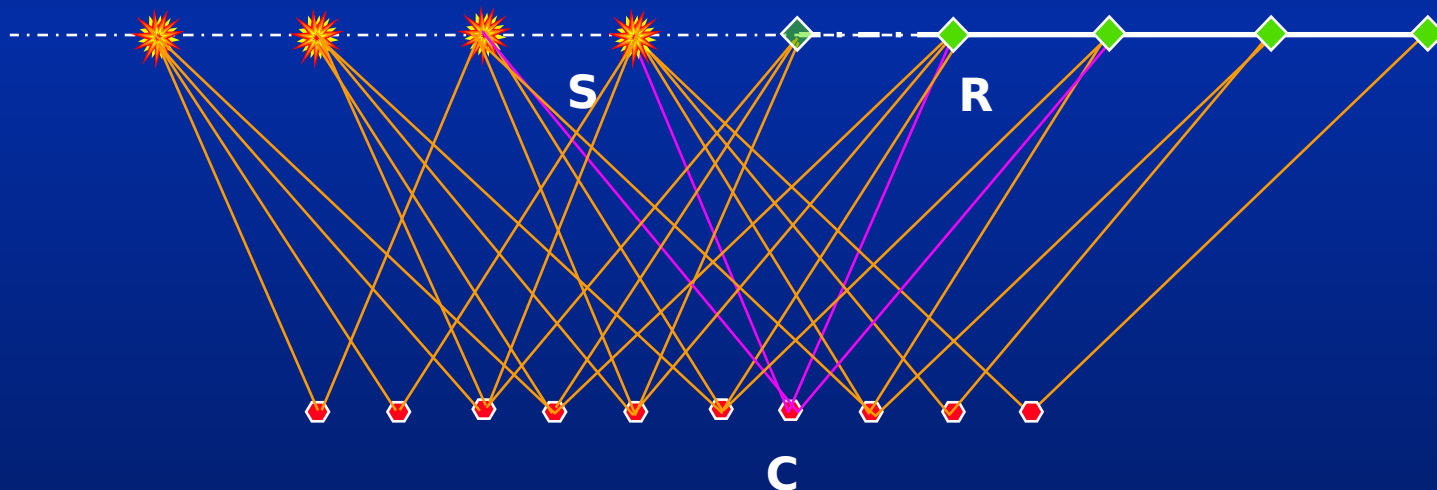
Shot Gather

A collection of traces originating from a single source, recorded by several receivers, multiple offsets



CMP Gather

A collection of traces recorded at several receivers, originating from several sources, multiple offsets, having common trace mid-points

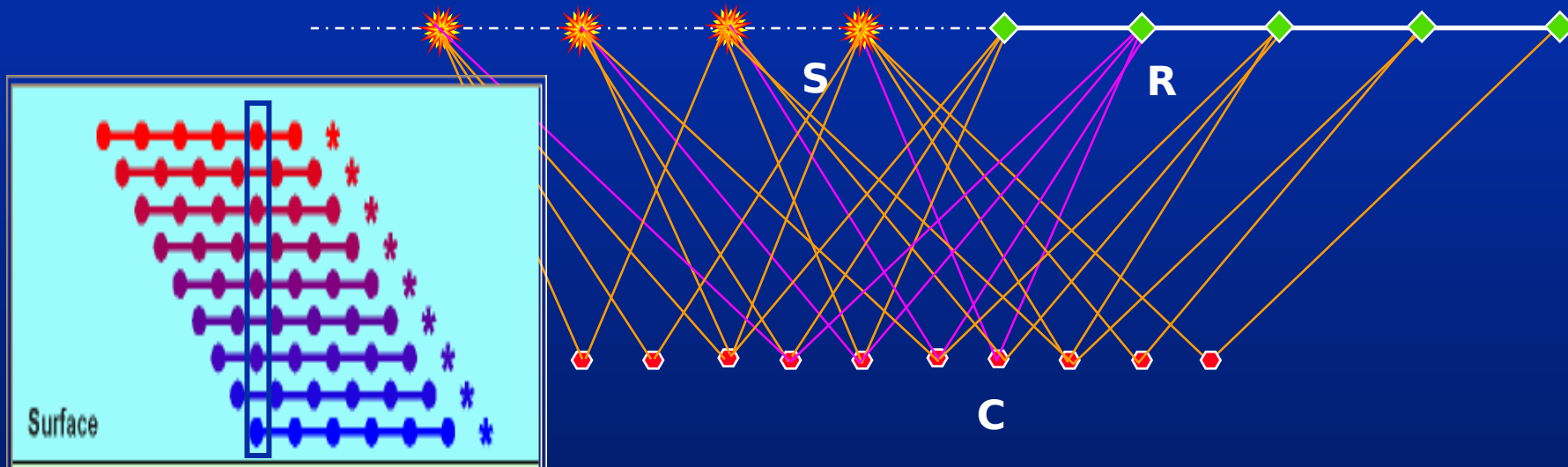


Receiver Gather

Land -

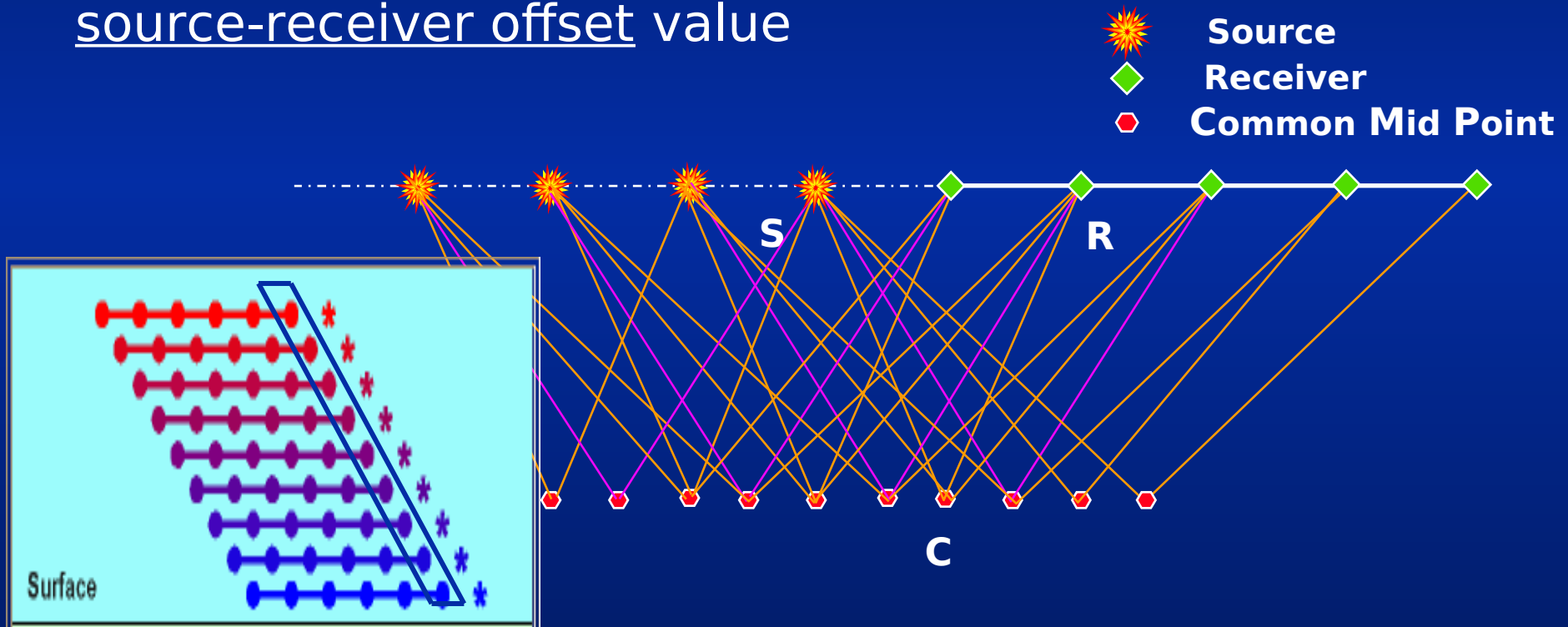
A collection of traces recorded at a single receiver, originating from several sources, multiple offsets

Source
Receiver
Common Mid Point

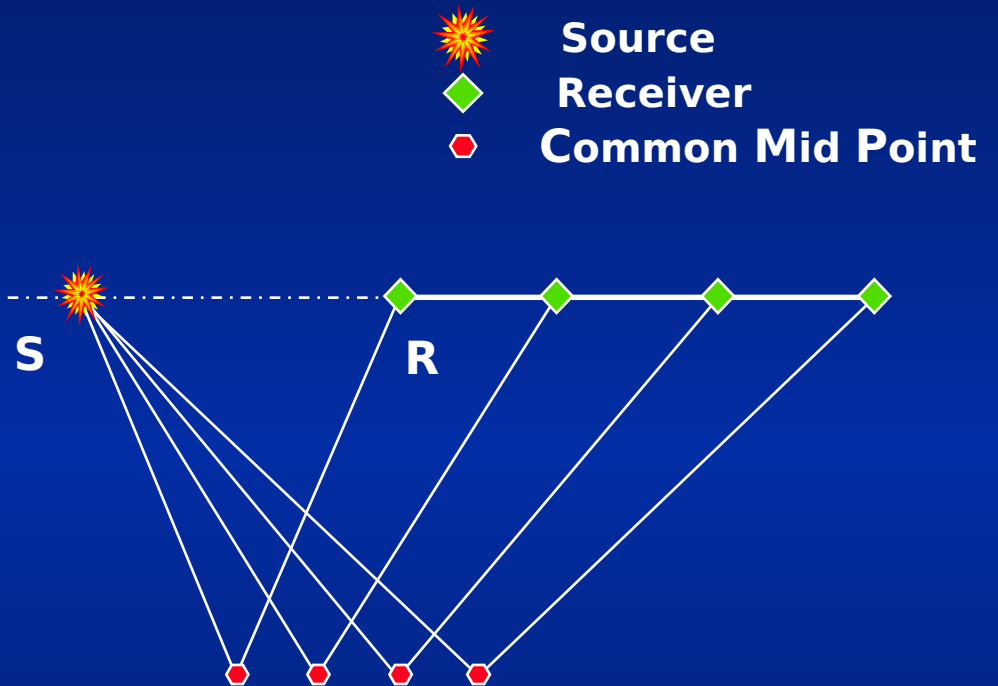
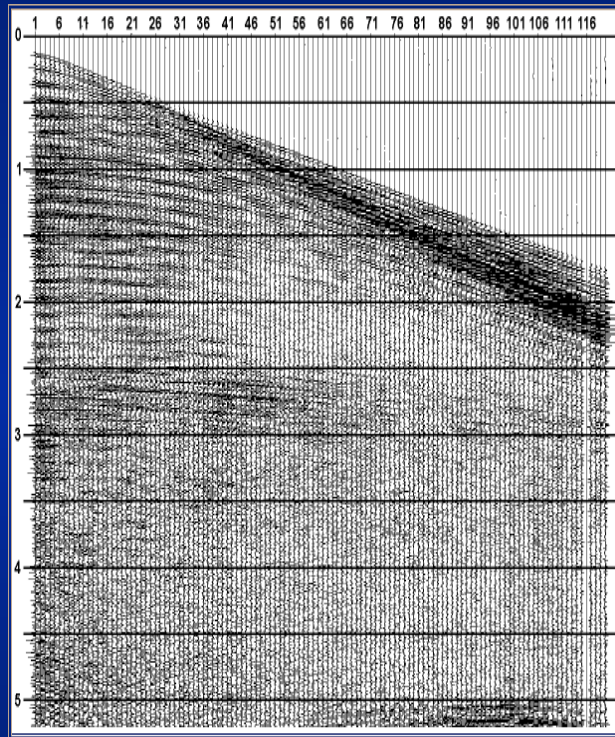


Common offset Gather

A collection of traces recorded at several receivers, originating from several sources but having a common source-receiver offset value

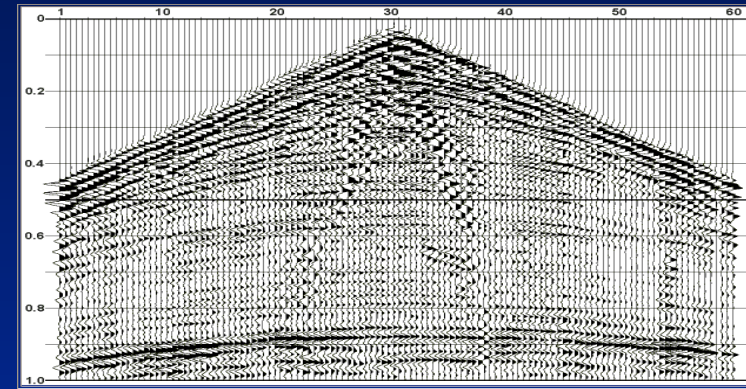
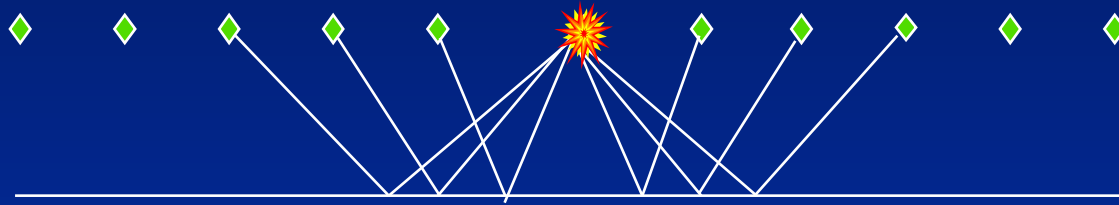


2D Marine layout

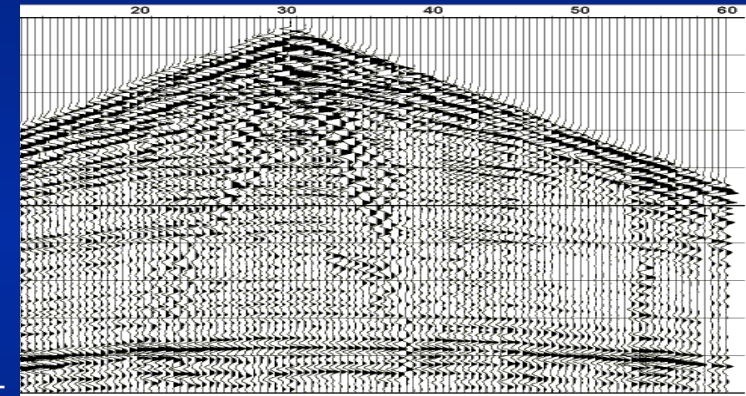
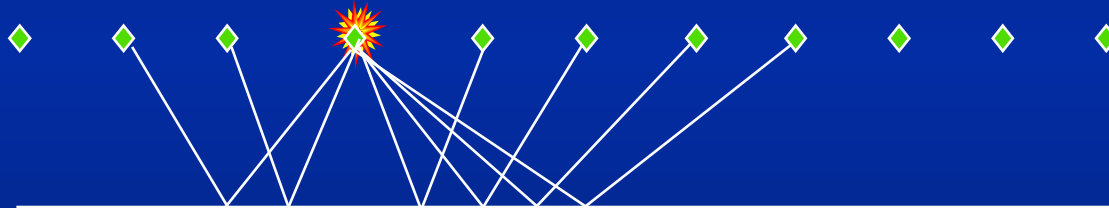


2D Land Field Layouts

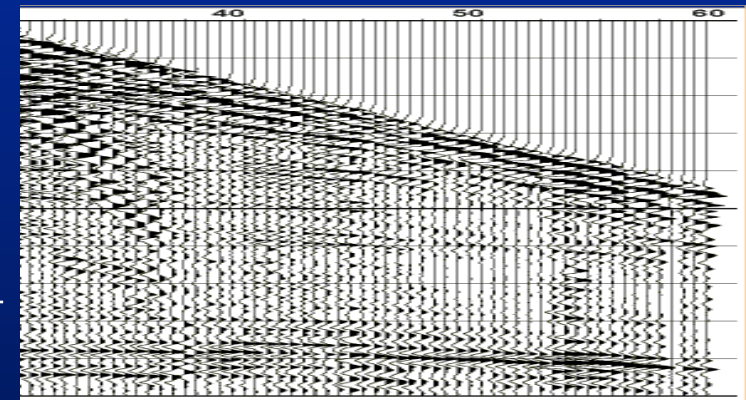
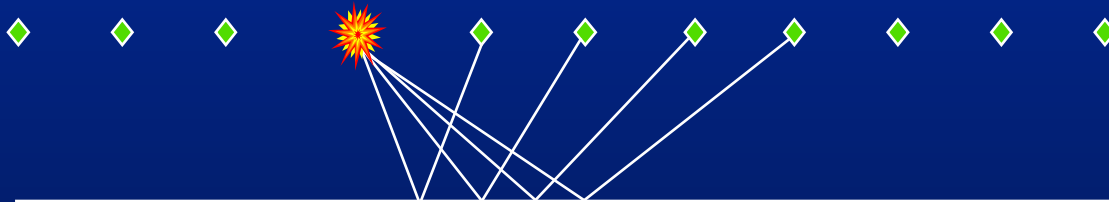
Symmetric split spread



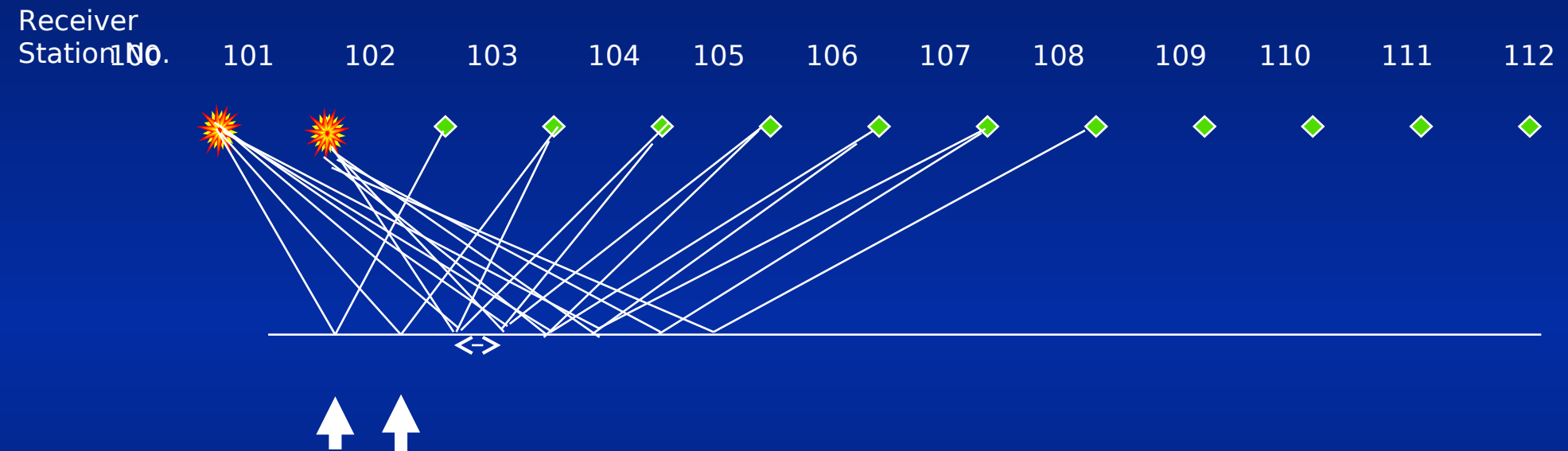
Asymmetric split spread



End on



Land Field Layouts -- End-on shooting



What is the Cmp interval? **HALF** the receiver interval

If the next SP is at receiver station 100, how many 'new cmps' will there be? **TWO**

The rest of the traces contribute to existing cmps and build up the **FOLD**

What do we mean by 'trace offset'?

THE DISTANCE BETWEEN SOURCE AND RECEIVER FOR THE TRACE

DP START Oslo
2004

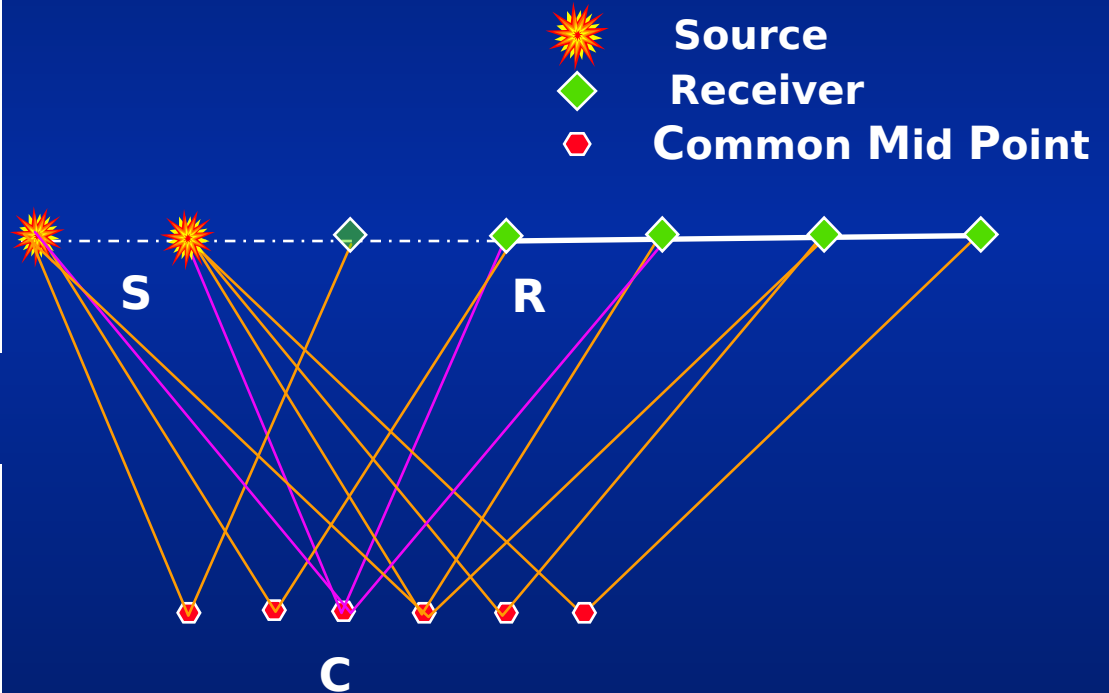
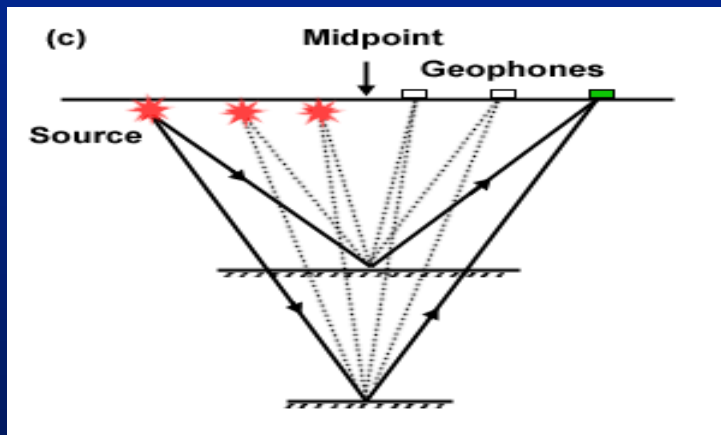
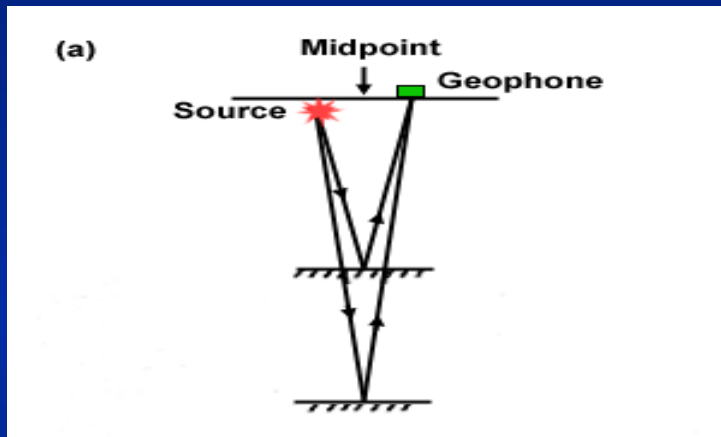
Multiple Coverage

At the end of this Session, you will be able to:

- **Define the term 'multiple coverage'.**
- **List the advantages of multiple coverage.**
- **Describe the concept of CMP coverage, using stacking diagram examples.**
- **Build a simple stacking diagram and calculate: trace offsets, nominal fold, last full-fold CMP, last CMP.**
- **Explain how, the source station and receiver station separation can control the CMP interval, the fold and the offset distribution.**

Multiple Coverage

Seismic arrangement whereby the same portion of the subsurface is imaged several times.



Multiple Coverage

The use of multiple coverage in seismic data acquisition can effectively:

- 1. Reduce random noise**
- 2. Reduce coherent noise**
- 3. Enable us to study the data in both shot order and CMP order.**
- 4. Reduces the effect of missing shots**
- 5. Attenuate multiple path signals**
- 6. Provide the information needed to work out the velocities from the subsurface signals.**

Clip

Multiple Coverage

[Clip1](#)

[Clip2](#)

Calculations

$$\text{CMP INT} = (\text{Groupint}/2)$$

$$\text{Number of NEW cmps / Shot} = (\text{Shot int} / \text{CMP int})$$

NB. True where G.I and Shot interval are integer multiples of each other and 'end-on' shooting. For other configurations, you may have to draw to confirm fold.

$$\text{Fold} = (\text{Groupint}/\text{Shot int}) * (\text{No.channels}/2)$$

$$\text{First live CMP} = [(\text{FTO}/2) / \text{CMP int}] + 1$$

$$\text{first full fold CMP} = \text{first live CMP} + [(\text{fold} - 1) * (\text{no. new cmps per shot})]$$

IN OMEGA THE FIRST LIVE CMP IS USER DEFINED - IT DEFAULTS TO 1!
THIS FORMULA IS APPLICABLE TO SOME OLDER SOFTWARE SYSTEMS

$$\text{with maximum fold} = \text{first live CMP} + [((\text{no.shots} - 1) * (\text{no. new cmps per shot})) + (\text{no. new cmps per shot})]$$

$$\text{MP} = \text{last full fold CMP} + [(\text{fold} - 1) * (\text{no. new cmps per shot})]$$

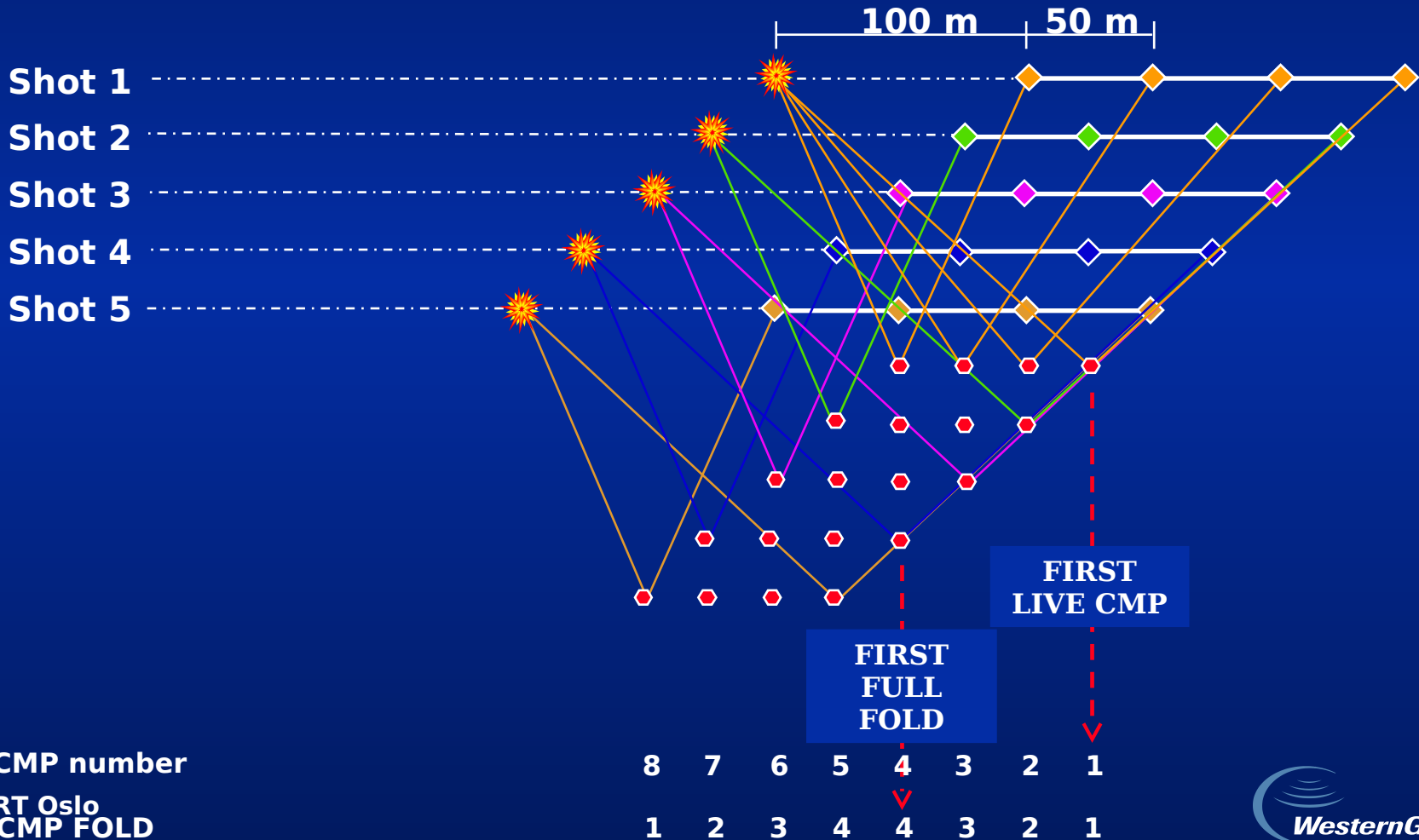
Stacking Diagram Construction example

4 Channels
5 Shots

SPINT 25m
GRPINT 50m
NTO 100m



Source
Receiver
Common Mid Point



Exercises in building stacking diagram

Practical Exercise

Line UK-AJ-34a

Shot point range : 101-110

Data Length : 4000ms

Number of channels : 8

Sample interval : 4ms

Shot point interval : 50m

Group Interval : 25m

Near trace offset : 125m

Average source depth: 6m

Average cable depth: 10m

From the information supplied (left) for a 2D seismic line , construct a stacking diagram to derive

a) the maximum fold

b) the last CMP number on the line.

Note: The number of the first cmp

defaults to 1 in Omega

Also calculate the following

Calculations

$$\text{CMP INT} = (\text{Groupint}/2)$$

$$\text{Number of NEW cmps / Shot} = (\text{Shot int} / \text{CMP int})$$

NB. True where G.I and Shot Interval are integer multiples of each other.

For other configurations, you may have to draw to confirm fold.

~~In this case, the configuration is 'regular'.~~

$$\text{ld} = (\text{Groupint}/\text{Shot int}) * (\text{No.channels}/2) = (25/50) * (8/2) = 2$$

$$\text{First live CMP} = 1 \quad \text{because we used the Omega default}$$

$$\begin{aligned} \text{first full fold CMP} &= \text{first live CMP} + [(\text{fold} - 1) * (\text{no. new cmps per shot})] \\ &= 1 + [(2 - 1) * 4] \\ &= 5 \end{aligned}$$

$$\begin{aligned} \text{with maximum fold} &= \text{first live CMP} + [((\text{no.shots} - 1) * (\text{no. new cmps per shot})) + (\text{no. new cmps per shot})] \\ &= 1 + [((10 - 1) * (4)) + (4 - 1)] \\ &= 40 \end{aligned}$$

$$\begin{aligned} \text{MP} &= \text{last full fold CMP} + [(\text{fold} - 1) * (\text{no. new cmps per shot})] \\ &= 40 + [(2 - 1) * 4] \\ &= 44 \end{aligned}$$

Practical Exercise

Line UK-AJ-34a

Shot point range : 101-120

Data Length : 4000ms

Number of channels : 10

Sample interval : 4ms

Shot point interval : 25m

Group Interval : 25m

Near trace offset : 125m

Average source depth: 6m

Average cable depth: 10m

From the information supplied (left) for a 2D seismic line , construct a stacking diagram to derive

a) the maximum fold

b) the last CMP number on the line.

Note: The number of the first cmp defaults to 1 in Omega

Calculations

$$\text{CMP INT} = (\text{Groupint}/2)$$

$$\text{Number of NEW cmps / Shot} = (\text{Shot int} / \text{CMP int})$$

NB. True where G.I and Shot Interval are integer multiples of each other.

For other configurations, you may have to draw to confirm fold.

~~In this case, the configuration is 'regular'.~~

$$\text{ld} = (\text{Groupint}/\text{Shot int}) * (\text{No.channels}/2) = (25/25) * (10/2) = 5$$

$$\text{First live CMP} = 1 \quad \text{because we used the Omega default}$$

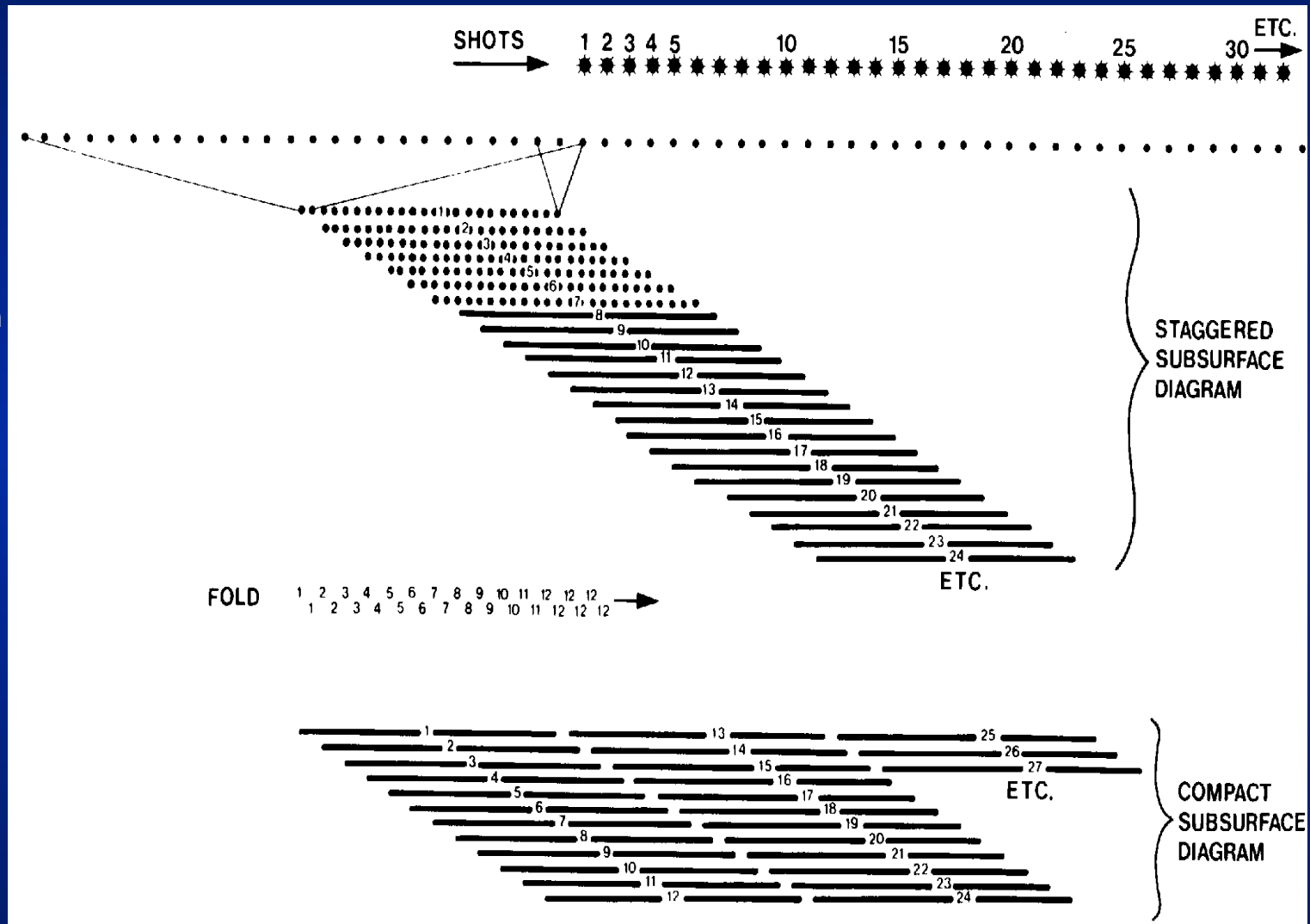
$$\begin{aligned} \text{first full fold CMP} &= \text{first live CMP} + [(\text{fold} - 1) * (\text{no. new cmps per shot})] \\ &= 1 + [(5 - 1) * 2] \\ &= 9 \end{aligned}$$

$$\begin{aligned} \text{with maximum fold} &= \text{first live CMP} + [((\text{no.shots} - 1) * (\text{no. new cmps per shot})) + (\text{no. new cmps per shot})] \\ &= 1 + [((20 - 1) * (2)) + (2 - 1)] \\ &= 40 \end{aligned}$$

$$\begin{aligned} \text{MP} &= \text{last full fold CMP} + [(\text{fold} - 1) * (\text{no. new cmps per shot})] \\ &= 40 + [(5 - 1) * 2] \\ &= 48 \end{aligned}$$

Typical Land Subsurface Diagram

Also known as a
**Stacking
Diagram/Chart**

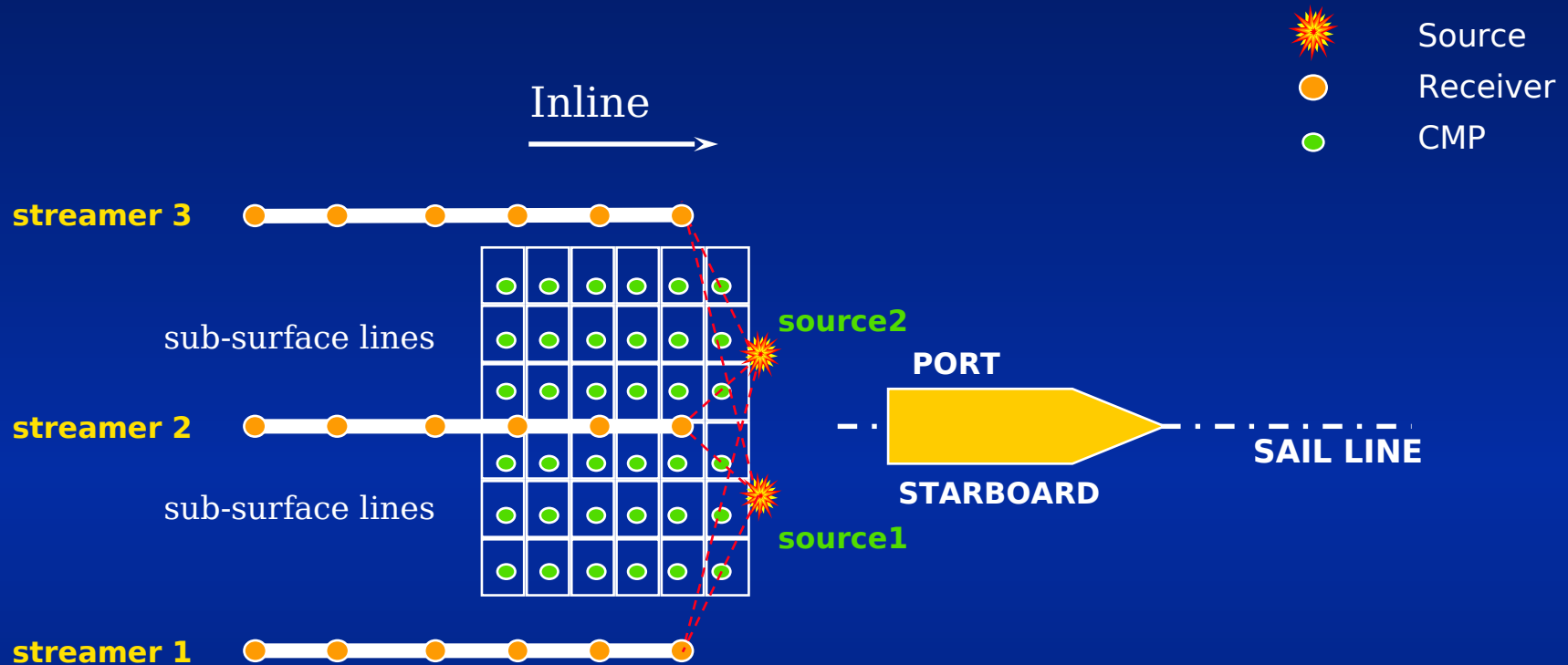


Miscellaneous

At the end of this Session, you will be able to:

- **To describe 3D acquisition techniques and its effects on geometry in processing.**
- **Define the following terms: 'sub-surface line', 'bin', 'sail line'**
- **To describe common navigation and survey storage formats used in the field.**
- **Identify UKOOA P1/90 and SPS format navigation/survey data files.**
- **Explain the consequence of trace summation or trace decimation on the following: coverage, trace offsets, effective group interval, CMP interval and trace no.**

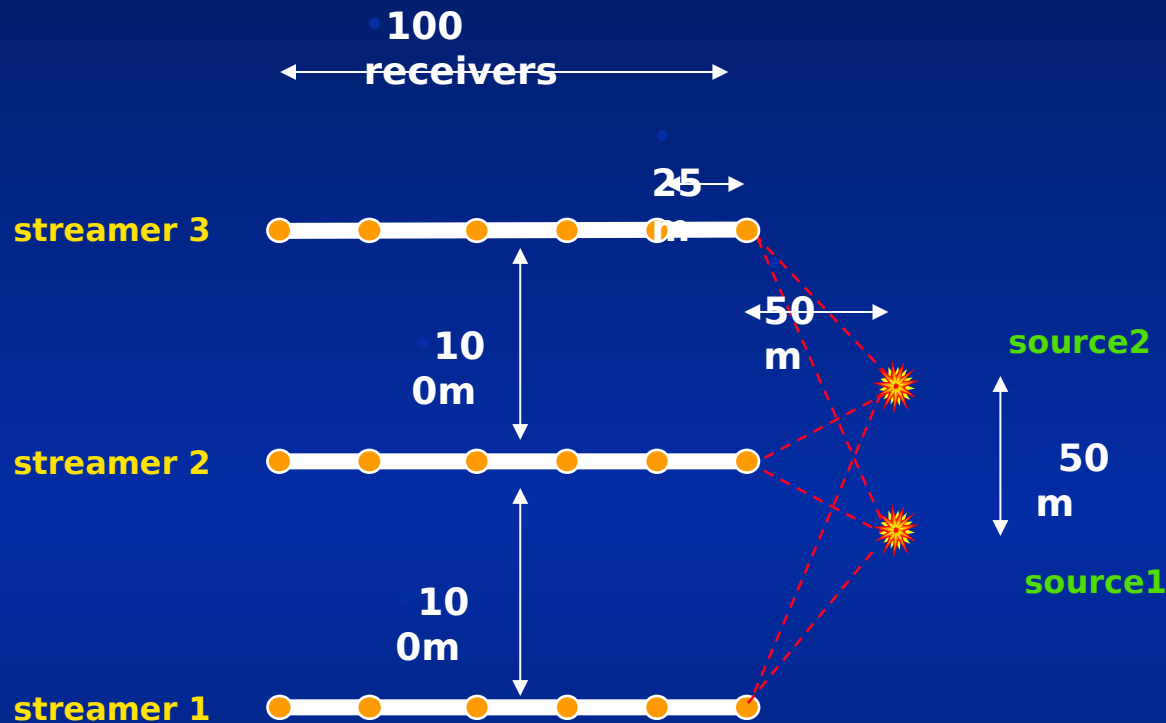
3D Geometry



subsurface lines are recorded each pass of the boat
forms a finely sampled volume of information.

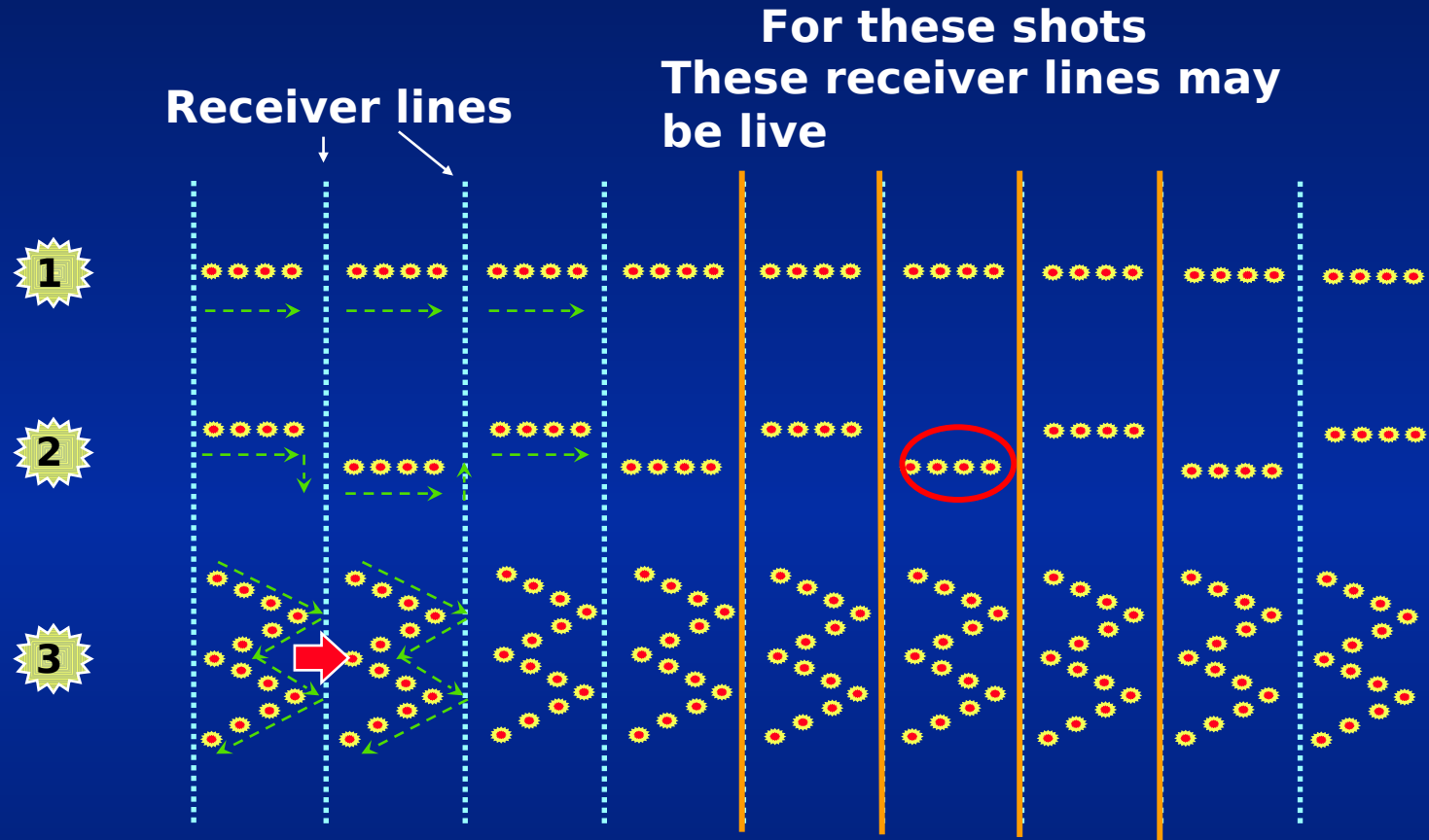
bins is overlaid, each cmp position falling at the centre of

3D Geometry



How many Near Trace and Far Trace Offset values will occur here?

Land 3D Acquisition



P1/90 UK00A Header example

```

H0100AREA NAME ..... MOCS Block 15/12
H0101JOB DESCRIPTION ..... Six streamer, dual source.
H0102VESSEL DETAILS ..... SEARCHER
H0103SOURCE DETAILS ..... STBD SOURCE 1 1
H0103SOURCE DETAILS ..... PORT SOURCE 1 2
H0104STREAMER DETAILS ..... 1 5001 288 RECEIVERS 1 1 1
H0104STREAMER DETAILS ..... 2 5002 288 RECEIVERS 1 2 2
H0104STREAMER DETAILS ..... 3 5003 288 RECEIVERS 1 3 3
H0104STREAMER DETAILS ..... 4 5004 288 RECEIVERS 1 4 5
H0104STREAMER DETAILS ..... 5 5005 288 RECEIVERS 1 5 6
H0104STREAMER DETAILS ..... 6 5006 288 RECEIVERS 1 6 7
H0105OTHER DETAILS ..... F007 FLOAT 1 4
H0200DATE OF SURVEY ..... 19950407
H0201DATE OF TAPE ..... 03:05:95
H0202TAPE VERSION ID ..... F8538-010A
H0203LINE PREFIX ..... SG9501-
H0300CLIENT NAME ..... SAGA PETROLEUM
H0400GEOPHYSICAL CONTRACTOR..... GECO-PRAKLA
H0500POSITION CONTRACTOR..... KONGSBERG NAVIGATION AS, GECO-PRAKLA
H0600POS. PROC. CONTRACTOR..... GECO-PRAKLA
H0700POS./ COMPUTER SYSTEM..... VESSEL POSITION: TRINAV DGPS
H0700 ..... KN DIFFSTAR
H0700 ..... DIRECT INJECTION TRIMBLE
H0700 ..... FLOAT POSITION: KN DIFFSTAR
H0700 ..... MORSTAR VERSION: 905-950415
H0700 ..... TRINAV VERSION: 2.3.4_31/MAR/95
H0800COORDINATE LOCATION..... CENTRE OF SOURCE
H0900OFFSET REF PT V1 TO S SRC: 1 2 25.00 -275.00
H0900OFFSET REF PT V1 TO P SRC: 1 2 -25.00 -275.00
H0900OFFSET REF PT V1 TO 1 STR: 1 2 250.00 -475.00
H0900OFFSET REF PT V1 TO 2 STR: 1 2 150.00 -475.00
H0900OFFSET REF PT V1 TO 3 STR: 1 2 50.00 -475.00
H0900OFFSET REF PT V1 TO 4 STR: 1 2 -50.00 -475.00
H0900OFFSET REF PT V1 TO 5 STR: 1 2 -150.00 -475.00
H0900OFFSET REF PT V1 TO 6 STR: 1 2 -250.00 -475.00
H1000CLOCK TIME RELATIVE GMT.: GMT + 0.0 HOURS
H1100NUMBER OF REC. GROUPS.... 1728
H1400GEODETTIC DATUM (SURVEY)... ED 50 Internat. 6378388.000 297.0000000
H1401TRANSFORMATION TO WGS84... -81.8 -98.1-111.5-0.105 0.031 0.080-0.3143000
H1500GEODETTIC DATUM (POSTPLOT)... ED 50 Internat. 6378388.000 297.0000000
H1501TRANSFORMATION TO WGS84... -81.8 -98.1-111.5-0.105 0.031 0.080-0.3143000
H1600DATUM TRANSFORMATIONS..... 0.0 0.0 0.0 0.000 0.000 0.000 0.0000000
H1700VERTICAL DATUM DESCR. .... SL ECHO SOUNDER
H1800PROJECTION TYPE ..... 001U.T.M. NORTHERN HEMISPHERE
H1900PROTECTION ZONE ..... 31 N
H2000GRID UNIT ..... 1METRES 01.0000000000000
H2001HEIGHT UNIT ..... 1METRES 01.0000000000000
H2002ANGULAR UNIT ..... 1DEGREES
H2200LONG. OF CENTR. MERID. ... 3 0 0.000E
H2301GRID ORIGIN ..... 0 0 0.000N 3 0 0.000E
H2302GRID COORD. AT ORIGIN ... 500000.00E 0.00N
H2401SCALE FACTOR ..... 0.9996000000
H2402LAT/LON WHERE SCALE DEF.. 0 0 0.000N 3 0 0.000E
H2600COMMENTS.....
H2600LINENAME/SUBLINE..... /00783-056/0b3
H2600TIME CREATED..... Wed May 3 04:20:43 1995
H2600VESSEL POSITIONS ARE THE OUTPUT OF THE LEAST SQUARES NETWORK ADJUSTMENT
H2600FLOAT POSITIONS ARE THE OUTPUT OF THE LEAST SQUARES NETWORK ADJUSTMENT
H2600AND MISSING DATA IS INTERPOLATED EXCEPT WHEN MORE THAN 10 CONSECUTIVE
H2600SHOTS ARE MISSING
H2600SOURCE POSITION IS THE KALMAN FILTERED OUTPUT OF THE LEAST SQUARES
H2600NETWORK ADJUSTMENT
H2600RECEIVER POSITIONS ARE COMPUTED USING FILTERED COMPASSES AND ARE
H2600TIED TO FRONT AND TAIL TRACKING NODES WHICH ARE KALMAN FILTERED
H2600OUTPUTS OF THE LEAST SQUARES NETWORK ADJUSTMENT
H2600DEPTH DATA UNCORRECTED FOR TRANSDUCER DEPTH
H2600DEPTH DATA UNCORRECTED FOR TIDE OR VELOCITY
H2600P190 OUTPUT FILE MADE.... Wed May 3 10:17:59 1995

```

General

Receiver Info.

General

Streamer offsets.

Projection and spheroid.

Navigation processing Info

P1/90 UKOOA Header - Data area

1
2
3
4
5

V00783-056	1	1482581049.14N	2	5 2.78E	446132.96449298.3	75.9122195434
S00783-056	12	1482581049.30N	2	519.56E	446407.26449299.5	75.9122195434
Z00783-056	11	1482581050.64N	2	519.06E	446399.66449341.1	75.9122195434
Z00783-056	12	1482581049.30N	2	519.56E	446407.26449299.5	75.9122195434
T00783-056	1 1	1482581112.39N	2	914.35E	450251.86449963.9	75.9122195434
T00783-056	1 2	14825811 9.08N	2	915.34E	450266.66449861.1	75.9122195434
T00783-056	1 3	14825811 6.22N	2	914.99E	450259.86449772.8	75.9122195434
T00783-056	1 4	1482581049.30N	2	523.50E	446471.56449298.8	75.9122195434
T00783-056	1 5	14825811 2.93N	2	915.80E	450271.86449671.0	75.9122195434
T00783-056	1 6	1482581059.88N	2	916.32E	450279.16449576.6	75.9122195434
T00783-056	1 7	1482581056.11N	2	917.27E	450293.16449459.8	75.9122195434
R 1	446581.66449593.7 9.0	2	446594.06449594.5 9.0	3	446606.46449595.4 9.01	
R 4	446618.86449596.2 9.0	5	446631.26449597.1 9.0	6	446643.76449598.0 9.01	
R 7	446656.16449598.9 9.0	8	446668.56449599.8 9.0	9	446680.96449600.6 9.01	
R 10	446693.36449601.5 9.0	11	446705.86449602.5 9.0	12	446718.26449603.4 9.01	
--More-- (0%)						

- 1) 'V' is the vessel position.
- 2) 'S' is active firing source.
- 3) 'Z' is all source positions.
- 4) 'T' is tailbuoy positions.
- 5) 'R' is receiver positions.

Shell Processing Support (SPS) Shot/Receiver file example

SPS

```
H Source of Geodetic Data= Advance Positioning's SEISURV System
H Origin: Latitude= 27-50
H Origin: Longitude= 99-00
H Origin: False Easting(ft)= 2000000.00
H Origin: False Northing(ft)= 0.00
H Parallel (Latitude)= 29-20
H Scale Ratio= 1: 7300
H R (reduction in ft/1000)= 0.136800
H Standard Parallels (deg-min)= 28-23 & 30-17
H Origin of Longitude= Greenwich
H FEET are the units used for the following grid coordinates and elevations.
```

← **General Header Information**

H26 SPS HEADER

H26	DEFINITION OF FIELD COLS	FORMAT	UNITS
H26	LINE NAME	2-17	4A4 -
H26	POINT NUMBER	18-25	2A4 -
H26	POINT INDEX	26-26	I1 -
H26	POINT CODE	27-28	A2 -
H26	STATIC CORRECTION	29-32	I4 MSEC
H26	POINT DEPTH	33-36	F4.1 METRE
H26	SEISMIC DATUM	37-40	I4 METRE
H26	UPHOLE TIME	41-42	I2 MSEC
H26	WATER DEPTH	43-46	F4.1 METRE
H26	MAP GRID EASTING	47-55	F9.1 -
H26	MAP GRID NORTHING	56-65	F10.1 -
H26	SURFACE ELEVATION	66-71	F6.1 METRE
H26	DAY OF YEAR	72-74	I3 -
H26	TIME hhmmss	75-80	3I2 -

← **Location of information in the data block referenced by column numbers**

H26	1	2	3	4	5	6	7	8
H26	4567890123456789012345678901234567890123456789012345678901234567890							
Rhollow		10011R1			2646429.0	471024.0	133.0326090000	
Rhollow		10021R1			2646272.0	471178.0	134.0326090000	
Rhollow		10031R1			2646115.0	471332.0	135.0326090000	
Rhollow		10041R1			2645958.0	471486.0	137.0326090000	
Rhollow		10051R1			2645801.0	471640.0	139.0326090000	

← **Data Block**

SPS Relationship file
example

H26	SPS-HEADER	COLS	FORMAT
H26	DEFINITION OF FIELD		
H26	FIELD TAPE NUMBER	2-7	3A2
H26	FIELD RECORD NUMBER	8-11	I4
H26	FIELD RECORD INCREMENT	12-12	I1
H26	INSTRUMENT CODE	13-13	A1
H26	LINE NAME (SOURCE)	14-29	4A4
H26	POINT NUMBER (SOURCE)	30-37	2A4
H26	POINT INDEX (SOURCE)	38-38	I1
H26	FROM CHANNEL	39-42	I4
H26	TO CHANNEL	43-46	I4
H26	CHANNEL INCREMENT	47-47	I1
H26	LINE NAME (RECEIVER)	48-63	4A4
H26	FROM RECEIVER	64-71	2A4
H26	TO RECEIVER	72-79	2A4
H26	RECEIVER INCREMENT	80-80	I1

Field File No.

corresponds to -

Source station no.

This **channel range** comes
from
this **set of receivers**

H26	1	2	3	4	5	6	7	8
H26	4567890123456789012345678901234567890123456789012345678901234567890							
X	1	111	hollow	7051	1	601	hollow	1001
X	1	111	hollow	7051	61	1201	hollow	2001
X	1	111	hollow	7051	121	1801	hollow	3001
X	1	111	hollow	7051	181	2401	hollow	4001
X	1	111	hollow	7051	241	3001	hollow	5001
X	1	111	hollow	7051	301	3601	hollow	6001
X	1	111	hollow	7051	361	4201	hollow	7001
X	1	111	hollow	7051	421	4801	hollow	8001
X	1	611	hollow	7101	1	601	hollow	1001
X	1	611	hollow	7101	61	1201	hollow	2001
X	1	611	hollow	7101	121	1801	hollow	3001
X	1	611	hollow	7101	181	2401	hollow	4001
X	1	611	hollow	7101	241	3001	hollow	5001
X	1	611	hollow	7101	301	3601	hollow	6001
X	1	611	hollow	7101	361	4201	hollow	7001
X	1	611	hollow	7101	421	4801	hollow	8001
X	1	711	hollow	7111	1	601	hollow	1001
X	1	711	hollow	7111	61	1201	hollow	2001
X	1	711	hollow	7111	121	1801	hollow	3001



Data Block

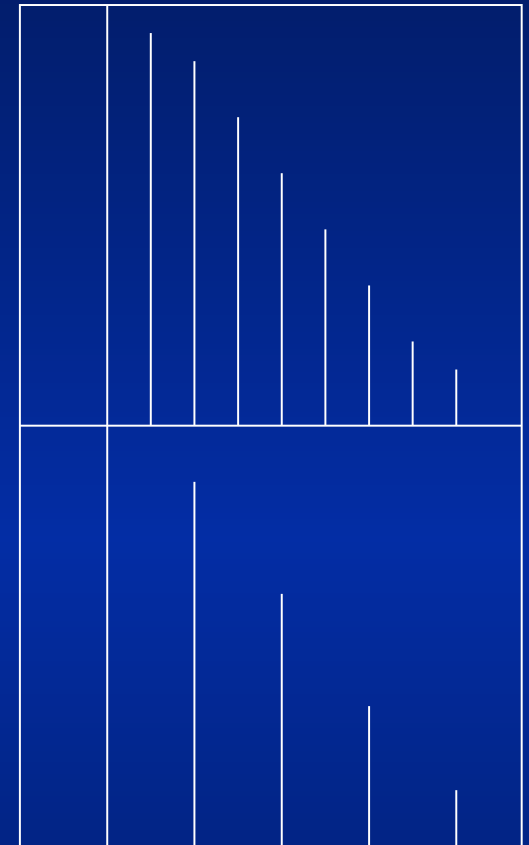
Definitions

Trace Decimation- This process involves reducing the data volume by dropping or discarding traces. Typically every second trace in a shot record is discarded.

Trace Summation- This process involves reducing the data volume by summing adjacent traces.

Trace no

1 2 3 4 5 6 7 8



Trace no

1 2 3 4

try with some figures for Decimation

Near trace offset 200m
Group interval 50m
Shotpoint interval
50m
Number of groups
120



Near trace offset?
Group interval ?
Shotpoint interval ?
Number of groups ?

Calculate the following :

1) CMP Interval

2) FTO

3) Fold

try with some figures for Summation

Near trace offset 200m
Group interval 50m
Shotpoint interval
50m
Number of groups
120



Near trace offset?
Group interval ?
Shotpoint interval ?
Number of groups ?

Calculate the following :

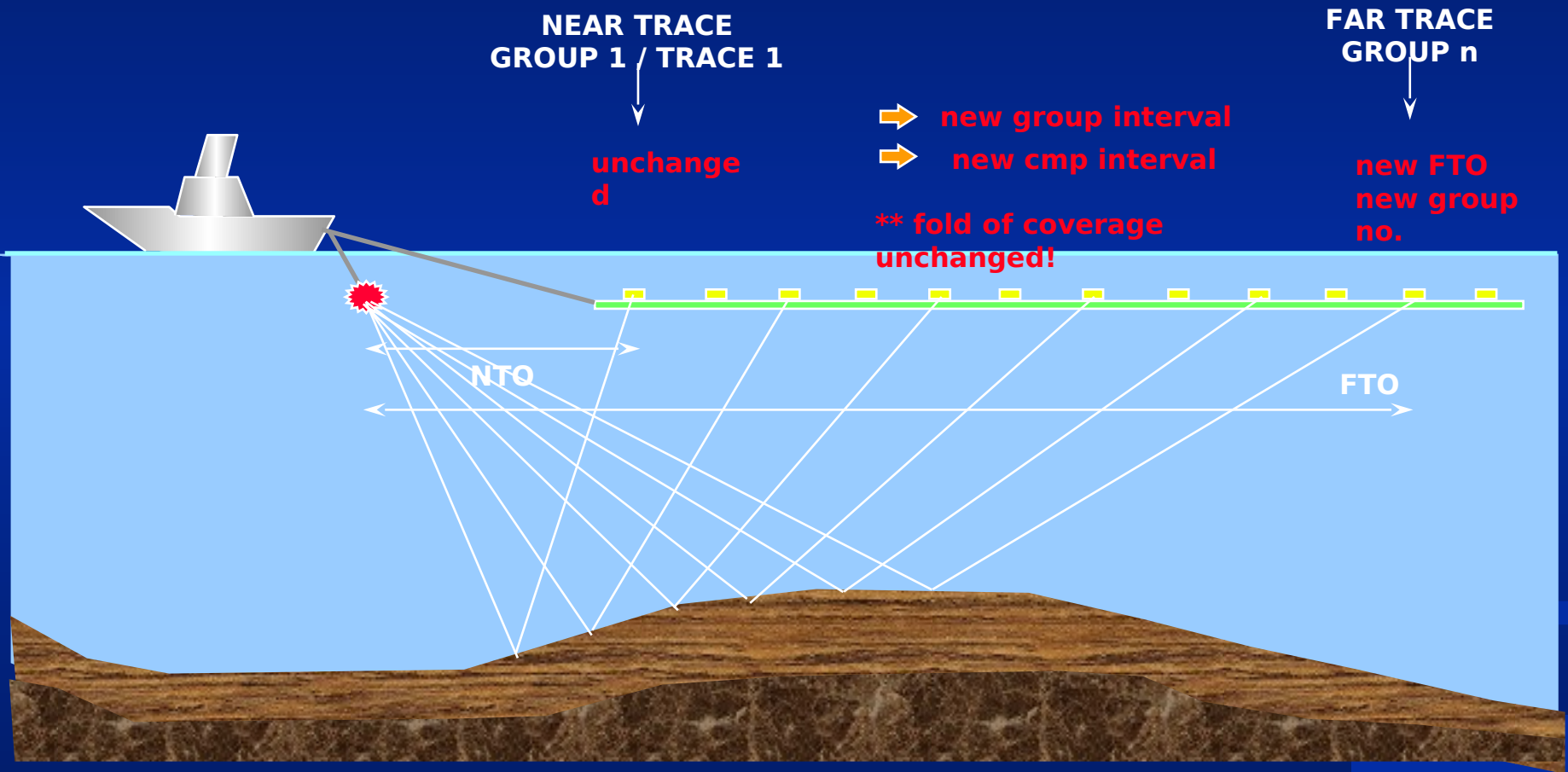
1) CMP Interval

2) FTO

3) Fold

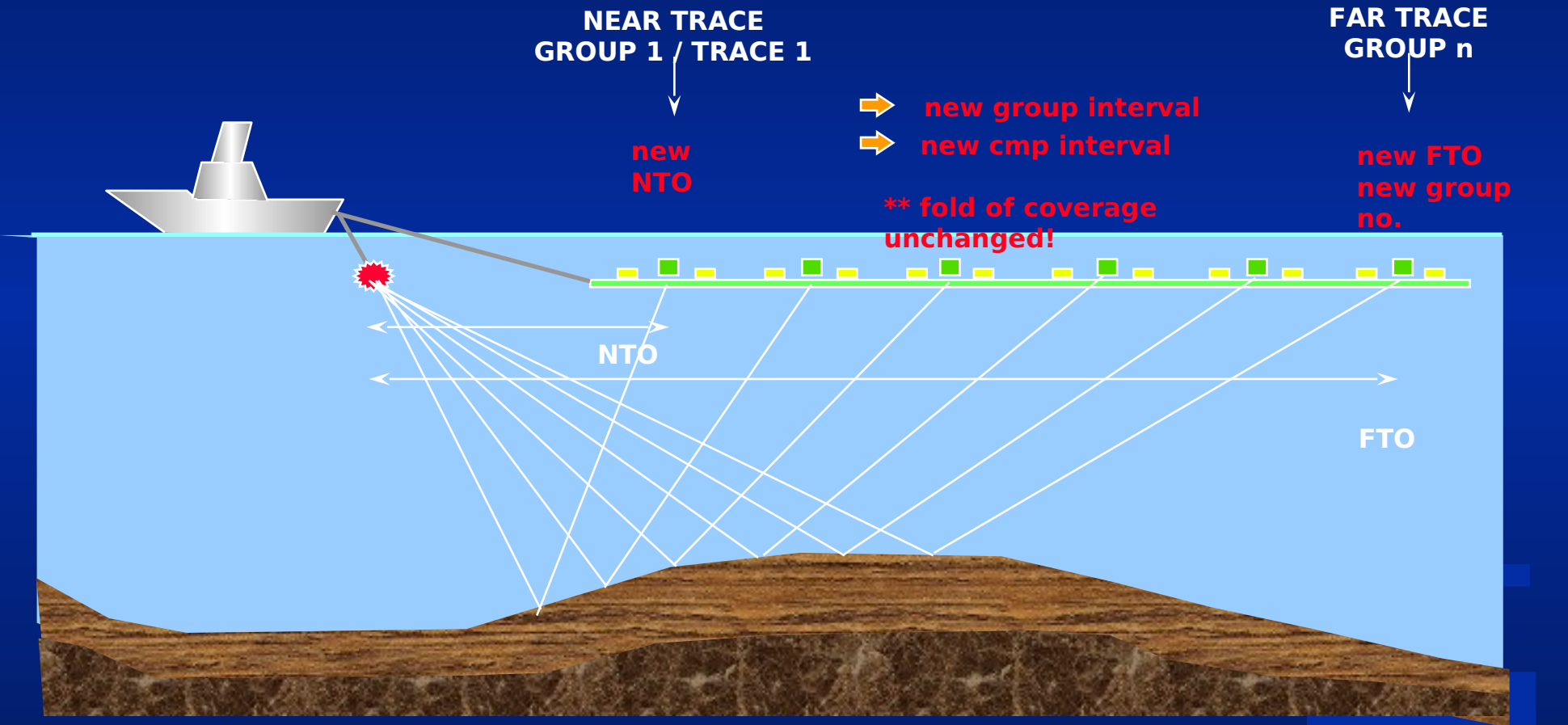
What happens to our geometry

Trace Decimation



What happens to our geometry

Trace Summation



d Finally some more Calculations

- 1) Calculate the total active length of each streamer**
- 2) Calculate all the Near Trace Offsets for the 3D configuration**
- 2) Calculate all the Far Trace Offsets for the 3D configuration**

Really Finally some more Calculations

For each of the given lines using the observers logs

- 1) Calculate the Fold**
- 2) Calculate the first live cmp**
- 2) Calculate the first full fold cmp**
- 3) Calculate the last full fold cmp**
- 4) Calculate the last cmp**